

As the Examiner is well aware, in order to establish a *prima facie* case of obviousness:

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. . . The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaech*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). *Manual of Patent Examining Procedure* (MPEP), 8<sup>th</sup> Edition, August 2001, § 2143.

In the Final Office Action, concerning Vahatalo et al., the Examiner asserts: As disclosed in the abstract and column 4 line 63 - column 8 line 50 and figure 5B, Rin and Sin are two waveforms in an audio channel which are used to calculate the delay from the outgoing echo location and the returned echo. The delay is set in adjustable delay element 43. Vahatalo et al. do not disclose that the location of the echo is calculated for an audio channel in a computer. Echo existed in acoustic environments and hybrid line environments. The method of determining the echo location would have been the same in either environment, as one of ordinary skill in the art would have known. Said method would require identifying the outgoing signal in part of the incoming signal, regardless if the signals were propagated through the air or transmission line. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to apply the technique used for echo location in transmission lines in systems having acoustic echo, such as computer/telephone speakerphones. . . Vahatalo et al. do not disclose a machine readable storage medium which executes the method.

Nonetheless, it was obvious at the time of invention to perform signal processing methods through the use of microcomputers where the method steps are instructions on machine readable storage media. The use of microcomputers adds efficiency and speed to the process. Final Office Action, pages 2-3.

However, claim 1, for example states:

A method for actively characterizing the latency of an audio channel of a computer, comprising:

creating at least two signal sample streams for a waveform in the audio channel;

detecting the presence of the first signal sample stream for said waveform and the second signal sample stream for said waveform at a point in said audio channel;

measuring the time between the detections of the signal sample streams; and

delaying at least one of the signal sample streams based, at least in part, on the time measured between the detections. (Independent claim 1).

Thus, **claim 1 clearly requires that two or more signal streams be created in the audio channel.** Contrary to the Examiner's suggestion, Rin and Sin are not signals, but instead, they are ports. This is made clear at, for example, Vahatalo et al., column 5, lines 5-10. Thus, Rin and Sin do not even qualify as the at least two signal streams required in claim 1.

Furthermore, even assuming, for the sake of argument, that Rin and Sin represent signals, it would be clear that Sin and Rin would then be electrical signals, not audio signals. Therefore, even assuming, for the sake of argument, that Sin and Rin were signals, they still would not be signals created in the audio channel. The hybrid pointed to by the Examiner in Vahatalo et al. is a circuit that operates on electrical signals, not audio signals. **Vahatalo et al. clearly**

distinguishes between acoustic echo cancellation and electrical echo cancellation, and teaches that Vahatalo et al. is directed to electrical echo cancellation.<sup>1</sup> See, e.g., Vahatalo et al., column 1, lines 27 - 65. The Examiner even admits that Vahatalo et al.'s disclosed hybrid is electrical, and that Vahatalo et al. does not relate to acoustic echo cancellation. For example, at pages 3-4 of the Final Office Action, the Examiner concedes that “[T]he subject matter of Vahatalo et al. is directed to hybrid circuit echo cancellation and does not disclose a signal output and input device for acoustic echo cancellation.” Final Office Action, pages 3-4. Thus, Vahatalo et al. does not disclose or suggest the at least two signal streams required in claim 1.

Additionally, Vahatalo et al. cannot be said to disclose or suggest delaying one or more of the signal streams based, at least in part, on the time measured between detections of the at least two signal streams, as is required in claim 1. Indeed, the Examiner has not cited any portion of Vahatalo et al. as disclosing or suggesting this additional limitation of claim 1. Accordingly, for this additional reason, Vahatalo et al. does not render obvious claim 1.

Claim 12 is similar in some respects to claim 1. It states:

A method for actively characterizing the latency of an audio channel of a computer, comprising:

- creating at least a first and a second waveform in said audio channel;
- detecting the presence of the first and second waveform at a point in said audio channel;
- measuring the time between the detections of the waveforms; and
- delaying at least one of the waveforms, based at least in part, on the time measured between the detections. (Claim 12).

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<sup>1</sup> At page 3 of the Final Office Action, the Examiner apparently asserts that it is well known to those skilled in the art that the method of determining acoustic echo is same as the method of determining electrical echo. Applicants respectfully traverse this assertion by the Examiner. Pursuant to MPEP § 2144.03, Applicants respectfully request that the Examiner either supply a prior art reference or personal affidavit to support the Examiner's assertion, or withdraw the Examiner's assertion and Examiner's rejection based on this assertion.

Again, Rin and Sin in Vahatalo et al. are ports of an electrical circuit, not waveforms in an audio channel, as is required in claim 12. Additionally, Vahatalo et al. cannot be said to disclose or suggest delaying at least one such waveform based, at least in part, on the time measured between detections of two such waveforms, as is required in claim 12. Indeed, as is the case with claim 1, the Examiner has not cited any portion of Vahatalo et al. as disclosing or suggesting this additional limitation of claim 12. Accordingly, as with claim 1, Vahatalo et al. fails to render obvious claim 12.

Claim 19 requires a machine-readable storage medium that stores instructions that when executed by a computer system result in creation in an audio channel of at least two signal streams for a waveform in an audio channel. Claim 22 requires a machine-readable storage medium that stores instructions that when executed by a computer system results in creation in an audio channel of at least two signal waveforms. As stated above, Rin and Sin in Vahatalo et al. are ports of an electrical circuit, not signal streams or waveforms in an audio channel.<sup>2</sup> Accordingly, Vahatalo et al. does not disclose or suggest claims 19 and 22.

Also in the Final Office Action, the Examiner has rejected claims 2-4, 7-10, and 16-17 under 35 USC § 103(a) as being rendered obvious by the combination of Vahatalo et al. in view of Park et al. (U.S. Patent No. 5,410,595). Applicants respectfully traverse this rejection.

Park et al. is cited by the Examiner as disclosing “an apparatus for speakerphone (acoustic) echo cancellation having a microphone 21 . . . and speaker 22 . . .” Final Office Action, p. 4. Even assuming, for the sake of argument, that Park et al. does disclose these features, because the Examiner’s position regarding Vahatalo et al. is incorrect, for the reasons presented above, the Examiner’s rejection is in error.

Claims 2-4 and 7-10 depend from claim 1 and include all of the limitations of claim 1. Likewise, claims 16-17 depend from claim 12 and include all of the limitations of claims 12.

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<sup>2</sup> The Examiner apparently acknowledges at page 3 of the Final Office Action that Vahatalo et al. fails to disclose a machine-readable storage medium that stores instructions whose execution results in the operations recited in claims 19 and 22, but nonetheless, the Examiner still asserts that claims 19 and 22 are rendered obvious by Vahatalo et al. Pursuant to MPEP § 2144.03, Applicants respectfully request that the Examiner either supply a prior art reference or personal affidavit suggesting the desirability of storing in a machine-readable medium instructions whose result in execution of the operations recited in claims 19 and 22, or withdraw the Examiner’s rejection of claims 19 and 22.

Neither Vahatalo et al., nor Park et al., nor their combination, disclose or suggest claims 1 and 12. Accordingly, claims 2-4, 7-10, and 16-17 cannot be rendered obvious by the combination of Vahatalo et al. in view of Park et al.

Specifically, Park et al. does not cure the deficiencies pointed out above regarding Vahatalo et al. Neither patent, either individually or in combination, teaches or suggests (1) creating two signal streams or waveforms in the audio channel, or (2) delaying one or more of the signal streams or waveforms based, at least in part, on the time measured between detections of the at least two signal streams or waveforms, as the case may be.

Indeed, Park et al., for example, does not recognize the latency estimation issue that exists in the computer environment, as described and claimed in the subject application. Park et al. employs hardware synchronization of separate clocks, rather than estimating the latency. Park et al. states that “the output clock for DAC 66 is synchronized to the input clock for ADC 61.” Park et al., column 5, lines 64-66. Park et al. specifically defines terms “N” and “DELAY” in connection with this clock synchronization. Park et al., column 5, lines 52-59 and column 6, lines 3-10. Based upon these portions of Park et al., it is clear that only one signal is employed to estimate a delay (although yet another difference is that this delay is not the same or similar to the delay measured in the subject application). Likewise, Vahatalo et al. distinguishes between, and does not relate to acoustic echo cancellation. Accordingly, for all of the above reasons, it is respectfully submitted that claims 2-4, 7-10, and 16-17 are not rendered obvious by Vahatalo et al. in view of Park et al.

Additionally, the Examiner has rejected claims 5-6 under 35 USC § 103(a) as being rendered obvious by Vahatalo et al. in view of Park et al. and Hollier (U.S. Patent No. 5,890,104). Applicants respectfully traverse this rejection.

Claims 5-6 depend from claim 1, and thus, must be read as incorporating the limitations of claim 1. Hollier fails to cure the deficiencies pointed out above regarding Vahatalo et al. and Park et al. vis-à-vis claim 1. None of these patents, either singly or in combination, teach or suggest (1) creating two signal streams in the audio channel, or (2) delaying one or more of the

signal streams based, at least in part, on the time measured between detections of the at least two signal streams, as is required in Applicants' claim 1. Hollier, for example, relates to testing telecommunications equipment. Hollier has nothing to do with an audio channel or acoustic echo cancellation, and therefore, the combination proffered by the Examiner is improper.<sup>3</sup> It is quite clear that the Examiner has engaged in hindsight to pick through isolated disclosures in a vain effort to assemble the elements of Applicants' claims. Accordingly, it is respectfully submitted that the Examiner's rejection of claims 5-6 under 35 USC § 103(a) as being obvious over Vahatalo et al. in view of Park et al. and Hollier has been overcome.

The Examiner has also rejected claims 13, 14, 20, 21, 23, and 24 under 35 USC § 103(a) as being obvious over Vahatalo et al. in view of Hollier. Applicants respectfully traverse this rejection.

Claims 13 and 14 depend from claim 12, and thus, must be read as incorporating the limitations of claim 12. Claims 20 and 21 depend from claim 19, and thus, must be read as incorporating the limitations of claim 19. Claims 23 and 24 depend from claim 22, and thus, must be read as incorporating the limitations of claim 22. Hollier fails to cure the deficiencies pointed out above regarding Vahatalo et al. vis-à-vis claims 12, 19, and 22. Neither of these patents, either alone or in combination, teaches or suggests creating two signal streams or waveforms in the audio channel, as is required in claims 12, 19, or 22, as the case may be. Additionally, neither of these patents, either alone or in combination, teaches or suggests delaying one or more of the waveforms based, at least in part, on the time measured between detections of the at least two waveforms, as is required in claim 12. Additionally, for the reasons stated above, the combination proffered by the Examiner is improper.<sup>4</sup> This is yet further

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<sup>3</sup> At page 5 of the Final Office Action, the Examiner asserts that "use of known signals to calculate . . . delay would have been more reliable, thereby prompting one of ordinary skill in the art to use them." Pursuant to MPEP § 2144.03, Applicants respectfully request that the Examiner either supply a prior art reference or personal affidavit to support the Examiner's assertion, or withdraw the Examiner's assertion and Examiner's rejection based on this assertion.

<sup>4</sup> At page 5 of the Final Office Action, the Examiner apparently asserts that it was well known to those skilled in the art at the time of the invention that "a computer system employing speakerphone capabilities, subject to echo cancellation would have benefited from determining the echo time." Pursuant to MPEP § 2144.03, Applicants respectfully request that the Examiner either supply a prior art reference or personal affidavit to support the Examiner's assertion, or withdraw the Examiner's assertion and Examiner's rejection based on this assertion.

evidence that the Examiner has engaged in hindsight to pick through isolated disclosures in a vain effort to assemble the elements of Applicants' claims! Accordingly, it is respectfully submitted that the Examiner's rejection of claims 13, 14, 20, 21, 23, and 24 under 35 USC § 103(a) as being obvious over Vahatalo et al. in view of Hollier has been overcome.

In view of the foregoing, it is respectfully submitted that all of the currently pending claims are in condition for allowance. Therefore, allowance at an early date is respectfully requested.

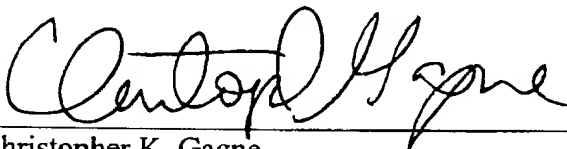
In the event that the Examiner has any questions or otherwise deems personal contact desirable, the Examiner is invited to call the undersigned attorney at 508-865-4168.

Please charge any shortages and credit any overcharges to Deposit Account number 02-2666.

Respectfully submitted,

Date:

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